

Claims

1. A diaphragm valve (1) comprising: a valve body (2); a diaphragm (12) which is sealed to the valve body (2) to define a flow passage (9) which extends between an inlet port (7) and an outlet port (8), both defined by the valve body (2); and an operating mechanism secured to the valve body (2) for moving the diaphragm (12) into sealing engagement with a seat (11) provided on the valve body (2) in order to close the flow passage (9) to fluid flow, characterised in that the valve body (2) and diaphragm (12) are formed as a disposable assembly having a relatively less flexible region which forms a valve seat (11) and a relatively more flexible region (12) which forms the diaphragm which may be forced into engagement with the valve seat (11) to close the flow passage (9) to fluid flow, and a housing (3) is provided for mechanically supporting the region of the valve body in which the seat area is defined.
2. A diaphragm valve (1) according to claim 1, wherein said housing (3) has a longitudinal through opening formed therein in which at least the region of the valve body in which the seat area is defined is mounted so as to support said region.
3. A diaphragm valve (1) according to claim 1 or claim 2, wherein said housing includes an aperture in the region of the diaphragm (12) in which said operating mechanism engages.
4. A diaphragm valve (1) according to any of the preceding claims, wherein said housing is formed by an upper support member (4) having a lower surface which engages an upper surface of said region of the valve body, and a lower support member (5) having an upper surface which engages a lower surface of said region of the valve body, said upper and lower surfaces of said support members (4, 5) being of complementary shape to the respective upper and lower surfaces of the said region.

5. A diaphragm valve (1) according to claim 4, wherein said support members (4, 5) define between each other a through opening through which said valve body extends.
6. A diaphragm valve (1) according to any of the preceding claims, wherein the region of the valve body (2) in which the seating area is defined has an upper wall and a lower wall, the upper wall being flexible and forming the diaphragm (14), and the lower surface being rigid and its inner surface forming the valve seat (11).
7. A diaphragm valve (1) according to claim 6, wherein said upper wall is thinner than said lower wall so as to be more flexible.
8. A diaphragm valve (1) according to claim 6 or claim 7, wherein said upper wall is of a different shape to said lower wall such that said upper wall is more flexible than said lower wall.
9. A diaphragm valve (1) according to any of claims 6 to 8, wherein said lower wall includes reinforcing means which increases its stiffness.
10. A diaphragm valve (1) according to any of claims 6 to 9, wherein said upper wall is formed of a more flexible material than said lower wall.
11. A diaphragm valve (1) according to any of the preceding claims, further including a pair of wings (13, 14) which extend laterally outwards from opposite sites of the valve body in the region of the valve seat.
12. A diaphragm valve (1) according to claim 11, where said wings (13, 14) extend longitudinally along the valve body and taper laterally towards said valve body (2) towards each end thereof so as to have a maximum width in the region of the valve

seat (12).

13. A diaphragm valve (1) according to any of the preceding claims, wherein the valve body (2) is of unitary construction, preferably a unitary moulding, such that the diaphragm (12) is integrally formed therewith.

14. A diaphragm valve (1) according to any of claims 1 to 12, wherein the diaphragm (12) is formed separately to and is sealingly welded to valve body (2), in particular by welding.

15. A diaphragm valve (1) according to any of the preceding claims wherein the diaphragm (12) is formed of a different material or different grade of material, in particular a different polymer or different grade of polymer, than at least the region of the valve body (2) which forms the valve seat (11).

16. A diaphragm valve (1) according to any of the preceding claims, wherein said housing (3) includes marking means which permanently marks the valve body upon mounting of the valve body therein so as to identify the valve body as having been used.

17. A diaphragm valve (1) according to claim 16, wherein marking means damages said valve body so as to prevent its reuse.

18. A diaphragm valve (1) according to any of the preceding claims, wherein said operating means (32) is mechanically coupled to said diaphragm such that upon movement of the operating means (32) towards the valve seat the diaphragm (12) is pressed by the operating means (32) against said valve seat (11) and upon movement of the operating means (32) away from the valve seat (11) the diaphragm is pulled away from the valve seat (11).

19. A diaphragm valve (1) according to claim 18, wherein a coupling means, in particular a cup (40), is formed, in particular integrally formed, on said diaphragm (12), which couplingly engages, in particular is a snap fit, with complementary coupling means, in particular a button (42) carries on the operating means (32).

20. A diaphragm valve (1) according to claim 19, wherein said diaphragm (12) is coupled to the operating means (32) in such a manner that the coupling means formed on the diaphragm is damaged upon uncoupling the diaphragm from the operating means (32), thereby prevent reuse of the valve body (2).

21. A diaphragm valve (1) according to any of the preceding claims, wherein the valve body is profiled to include a flat invert surface (24) extending through the body from the inlet port (7) to the outlet port (8) such that the valve body is self draining.